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EXAMINER

DODDS, HAROLD E

ART UNIT PAPER NUMBER

2167

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/993,940

Applicant(s)

MERRELLS ET AL.

Examiner

Harold E. Dodds, Jr.

Art Unit

2167

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12-29 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. The formal drawings were received on 6 November 2002. These drawings are accepted.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 5-7, and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes et al. ("The LDUP Replication Update Protocol"), Cai et al. (U.S. Patent Application Publication No. 2001/0016880), and Shaheen et al. (U.S. Patent No. 5,434,994).

4. Stokes renders obvious independent claim 1 by the following:

"...a supplier server..." at p. 3, sec. 4.

"...a consumer server in communication with the supplier server..." at p. 3, sec. 4.

"...that manage replication of data contained within the directory server..." at pp. 2 and 3, sec. 3.

"...from the supplier server to the consumer server..." at p. 3, sec. 4.

"...maintained on the consumer server..." at p. 3, sec. 4.

"...of data replicated to the consumer server..." at p. 3, sec. 4.

"...wherein replication of data..." at p. 3, sec. 4.

Stokes does not teach the use of pluggable services and the use of a change log.

5. However, Cai teaches the use of pluggable services as follows:

"...a plurality of pluggable services..." at pp. 2 and 3, par. 0045.

"...is managed by the plurality of pluggable services..." at pp. 2 and 3, par. 0045.

It would have been obvious to one of ordinary skill at the time of the invention to combine Cai with Stokes to provide pluggable services in order to support many formats of data during the replication of data from one server to another and provide greater acceptance of the system. Stokes and Cai have related applications and use many technologies in common. Stokes and Cai teach the use of directories, the use of servers, the use of protocol, the use of documents, and the replicating or updating of data. Stokes provides supplier and consumer servers and directories and Cai provides pluggable services.

Cai does not teach the use of change logs.

6. However, Shaheen teaches the use of change logs as follows:

"...and a change log..." at col. 5, lines 12-14.

"...using the change log..." at col. 5, lines 12-14.

It would have been obvious to one of ordinary skill at the time of the invention to combine Shaheen with Stokes and Cai to provide change logs in order to record all operations that cause a change to the replica data. Stokes, Cai, and Shaheen have related applications and use many technologies in common. Stokes, Cai, and Shaheen teach the use of directories, the use of servers, the use of protocol, and the replicating or updating of data and Cai and Shaheen teach the use of computers and the use of networks. Stokes provides supplier and consumer servers and directories, Cai provides pluggable services, and Shaheen provides change logs.

7. As per claim 5, the "...plurality of pluggable services..." is taught by Cai at pp. 2 and 3, par. 0045,  
the "...comprises an update resolution procedure service..." is taught by Stokes at pp. 2 and 3, sec. 3.,  
the "...determining ordering of operations..." is taught by Stokes at p. 2 and 3, sec. 3.,  
the "...by comparing a first change sequence number..." is taught by Stokes at p. 9, sec. 5.3.2.1.,  
the "...of the supplier server..." is taught by Stokes at p. 3, sec. 4.,  
the "...to a second change sequence number..." is taught by Stokes at p. 9, sec. 5.3.2.1.,  
and the "...of the consumer server..." is taught by Stokes at p. 3, sec. 4.

8. As per claim 6, the "...plurality of pluggable services...", is taught by Cai at p. 2 and 3, par. 0045,  
the "...comprises a replica update vector service...", is taught by Stokes at p. 6, sec. 5.2.,  
the "...determining a set of updates to be sent to a data replica...", is taught by Stokes at p. 6, sec. 5.2.,  
the "...by consulting a replica update vector...", is taught by Stokes at p. 6, sec. 5.2.,  
and the "...for the consumer server...", is taught by Stokes at p. 5, sec. 3.4.

9. As per claim 7, the "...replica update vector...", is taught by Stokes at p. 6, sec. 5.2.  
and the "...comprises a change sequence number for every data replica...", is taught by Stokes at pp. 8 and 9, sec. 5.3.2.1.

10. As per claim 9, the "...plurality of pluggable services...", is taught by Cai at pp. 2 and 3, par. 0045,  
the "...comprises a server-initiated replication protocol service...", is taught by Stokes at p. 3, sec. 4.,  
and the "...to store and update state information...", is taught by Stokes at p. 8, sec. 5.3.2., pp. 8 and 9, sec. 5.3.2.1., and p. 9, sec. 5.3.2.3.

11. As per claim 10, the "...state information comprises a uniqueid...", is taught by Stokes at p. 8, sec. 5.3.2. and pp. 8 and 9, sec. 5.3.2.1.,  
and the "...and a plurality of change sequence numbers for an entry...", is taught by Stokes at p. 8-9, sec. 5.3.2.1.

12. Claims 2-4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes, Cai, and Shaheen as applied to claim 1 above, and further in view of Dietterich et al. (U.S. Patent No. 6,647,393).

As per claim 2, the "...copied between the supplier server and the consumer server...", is taught by Stokes at p. 3, sec. 4.,  
the "...wherein replication of data...", is taught by Stokes at p. 3, sec. 4.,  
the "...is managed by the plurality of pluggable services...", is taught by Cai at p. 2 and 3, par. 0045,  
but the "...directory information tree..."  
and the "...using the directory information tree....," is not taught by either Stokes, Cai, or Shaheen.

However, Dietterich teaches the use of a directory information tree as follows:

"...The set 66 thus is a collection of directory information organized hierarchically, for example as a tree structure or as a graph, rooted in the root 80..." at col. 6, lines 58-61.

It would have been obvious to one of ordinary skill at the time of the invention to combine Dietterich with Stokes, Cai, and Shaheen to provide directories organized in a tree structures in order to use standard structures for directories in operating systems and gain acceptance of the system. Stokes, Cai, Shaheen, Dietterich have related applications and use many technologies in common. Stokes, Cai, Shaheen, and Dietterich teach the use of directories, the use of servers, the use of protocol, and the replicating or updating of data and Cai, Shaheen, and Dietterich teach the use of computers and the use of networks. Stokes provides supplier and consumer servers

and directories, Cai provides pluggable services, Shaheen provides change logs, and Dietterich provides directories organized in a tree structures.

13. As per claim 3, the "...directory information subtree...", is taught by Dietterich at col. 6, lines 58-67,  
the "...copied between the supplier server and the consumer server...", is taught by Stokes at p. 3, sec. 4.,  
the "...wherein replication of data...", is taught by Stokes at p. 3, sec. 4.,  
the "...is managed by the plurality of pluggable services...", is taught by Cai at pp. 2 and 3, par. 0045,  
and the "...using the directory information subtree...", is taught by Dietterich at col. 6, lines 58-67.

14. As per claim 4, the "...plurality of pluggable services...", is taught by Cai at pp. 2 and 3, par. 0045,  
the "...comprises a change sequence number service...", is taught by Stokes at p. 9, sec. 5.3.2.1.,  
the "...creating a unique combination of numbers...", is taught by Stokes at p. 9, sec. 5.3.2.1.,  
the "...used to determine ordering of an update operation...", is taught by Stokes at pp. 2 and 3, sec. 3.,  
the "...for an attribute value in an entry...", is taught by Stikes at p. 10, sec. 5.3.2.5. and p. 8, sec. 5.3.1,



and the "...in the directory information tree..." is taught by Dietterich at col. 6, lines 58-61.

15. As per claim 8, the "...plurality of pluggable services..." is taught by Cai at pp. 2 and 3, par. 0045,  
the "...comprises a replication agreement service..." is taught by Dietterich at col. 10, lines 31-39,  
"...comprising an entry in the directory information tree..." is taught by Dietterich at col. 6, lines 58-67,  
and the "...describing a relationship between the supplier server and the consumer server..." is taught by Stokes at pp. 4 and 5, sec. 4.2.

16. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes, Cai, and Shaheen as applied to claim 1 above, and further in view of Shih et al. (U.S. Patent No. 6,615,223).

As per claim 12, the "...plurality of pluggable services..." is taught by Cai at p. 2 and 3, par. 0045,  
the "...comprises a uniqueid service assigning a unique identifier to an entry..." is taught by Stokes at p. 8, sec. 5.3.1.,  
but the "...added by a client..." is not taught by either Stokes, Cai, or Shaheen.

However, Shih teaches clients adding entries as follows:

"...Consider if a client at replication site 302 wishes to add a new LDAP directory entry to the DIT 20 of FIG. 5..." at col. 8, lines 56-57.

It would have been obvious to one of ordinary skill at the time of the invention to combine Shih with Stokes, Cai, and Shaheen to allow clients to add entries in order to provide flexibility in updating the structures and gain acceptance of the system. Stokes, Cai, Shaheen, Shih have related applications and use many technologies in common. Stokes, Cai, Shaheen, and Shih teach the use of directories, the use of servers, the use of protocol, and the replicating or updating of data and Cai, Shaheen, and Dietterich teach the use of computers and the use of networks. Stokes provides supplier and consumer servers and directories, Cai provides pluggable services, Shaheen provides change logs, and Shih allows clients to add entries.

17. Claims 13, 14, 20-22, 24-26, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes et al. ("The LDUP Replication Update Protocol"), Shaheen et al. (U.S. Patent No. 5,434,994), and Bahl (U.S. Patent No. 6,782,398).

18. Stokes renders obvious independent claims 13 and 29 by the following:  
"...in the directory server..." at p. 3, sec 4.  
"...contained within the directory server from the supplier server to the consumer server..." at p. 3, sec 4.  
"...replicated to the consumer server..." at p. 3, sec 4.  
"...and updating data replicated to the consumer server..." at pp. 3 and 4, sec. 4.1.

Stokes does not teach the use of services for data replication, the use of change logs, and the determining a need to replicate data.

19. However, Shaheen teaches the use of services for data replication and the use of change logs as follows:

"...using a plurality of services to manage replication of data..." at col. 4, lines 18-21 and col. 2, lines 55-61.

"...maintaining a change log of data..." at col. 5, lines 12-14.

It would have been obvious to one of ordinary skill at the time of the invention to combine Shaheen with Stokes to provide services to manage the replication of data in order to use services provided by servers to control the access to other computers in a network to replicate data. Likewise, it would have been obvious to one of ordinary skill at the time of the invention to combine Shaheen with Stokes to provide change logs in order to record all operations that cause a change to the replica data. Stokes and Shaheen have related applications and use many technologies in common. Stokes and Shaheen teach the use of directories, the use of servers, the use of protocol, and the replicating of data. Stokes provides supplier and consumer servers and directories and Shaheen provides services to manage replication of data and change logs.

Shaheen does not teach the determining a need to replicate data.

20. However, Bahl teaches the determining a need to replicate data as follows:

"...determining a need to replicate data..." at col. 7, lines 7-10.

It would have been obvious to one of ordinary skill at the time of the invention to combine Bahl with Stokes and Shaheen to determine a need the replication of data for individual entries in order to provide the minimum update time to replicate data for new

or modified entries and provide maximum data accuracy at minimum cost. Stokes, Shaheen, and Bahl have related applications and use many technologies in common. Stokes, Shaheen, and Bahl teach the use of servers, the use of protocol, and the replicating of data and Shaheen and Bahl teach the use of computers, the use of databases, and the use of networks. Stokes provides supplier and consumer servers and directories, Shaheen provides services to manage replication of data and change logs, and Bahl determines the need to replicate data.

21. As per claim 14, the "...resolving conflicts of the replicated data..." is taught by Shaheen at col. 7, lines 66-68 and col. 2, lines 55-61, the "...using a time stamp..." is taught by Bahl at col. 6, lines 20-28, the "...to determine the consumer server..." is taught by Stokes at p. 3, sec. 4., and the "...holding the most recent version of the replicated data..." is taught by Bahl at col. 6, lines 40-43 and col. 7, lines 18-20.

22. As per claim 20, the "...plurality of services..." is taught by Shaheen at col. 4, lines 18-21, the "...comprises an update resolution procedure service..." is taught by Stokes at p. 2 and 3, sec. 3., the "...determining ordering of operations..." is taught by Stokes at pp. 2 and 3, sec. 3., the "...by comparing a first change sequence number..." is taught by Stokes at p. 9, sec. 5.3.2.1, the "...of the supplier server..." is taught by Stokes at p. 3, sec. 4.,

the "...to a second change sequence number..." is taught by Stokes at p. 9, sec.

5.3.2.1,

and the "...of the consumer server..." is taught by Stokes at p. 3, sec. 4.

23. As per claim 21, the "...plurality of services..." is taught by Shaheen at col. 4, lines 18-21,

the "...comprises a replica update vector service..." is taught by Stokes at p. 6, sec.

5.2.,

the "...determining a set of updates to be sent to a data replica..." is taught by Stokes at p. 6, sec. 5.2.,

the "...by consulting a replica update vector..." is taught by Stokes at p. 6, sec. 5.2.,

and the "...for the consumer server..." is taught by Stokes at p. 5, sec. 3.4.

24. As per claim 22, the "...replica update vector..." is taught by Stokes at p. 6, sec. 5.2.

and the "...comprises a change sequence number for every data replica..." is taught by Stokes at p. 8 and 9, sec. 5.3.2.1.

25. As per claim 24, the "...plurality of services..." is taught by Shaheen at col. 4, lines 18-21,

the "...comprises a server-initiated replication protocol service..." is taught by Stokes at p. 3, sec. 4.,

and the "...to store and update state information..." is taught by Stokes at p. 8, sec. 5.3.2., p. 8-9, sec. 5.3.2.1., and p. 9, sec. 5.3.2.3.

26. As per claim 25, the "...state information comprises a uniqueid...", is taught by Stokes at p. 8, sec. 5.3.2. and pp. 8 and 9, sec. 5.3.2.1.  
and the "...and a plurality of change sequence numbers for an entry...", is taught by Stokes at pp. 8 and 9, sec. 5.3.2.1.

27. As per claim 26, the "...the plurality of services...", is taught by Shaheen at col. 4, lines 18-21,  
the "...comprises an incremental update algorithm service...", is taught by Shaheen at col. 6, lines 18-23,  
the "...comparing a first replica update vector...", is taught by Stokes at p. 11, sec. 5.4.,  
the "...of the supplier server...", is taught by Stokes at p. 3, sec. 4.,  
the "...and a second replica update vector...", is taught by Stokes at p. 11, sec. 5.4.,  
the "...of the consumer server...", is taught by Stokes at p. 3, sec. 4.,  
the "...to order an update sequence...", is taught by Stokes at pp. 2 and 3, sec. 3.,  
and the "...from the change log...", is taught by Shaheen at col. 5, lines 12-14.

28. As per independent claim 28, the "...determining a need to replicate data...", is taught by Bahl at col. 7, lines 7-10,  
the "...in the directory server...", is taught by Stokes at p. 3, sec 4.,  
the "...using a plurality of services to manage replication of data...", is taught by Shaheen at col. 4, lines 18-21 and col. 2, lines 55-61,  
the "...contained within the directory server from the supplier server to the consumer server...", is taught by Stokes at p. 3, sec 4.,  
the "...maintaining a change log of data...", is taught by Shaheen at col. 5, lines 12-14,

the "...replicated to the consumer server..." is taught by Stokes at p. 3, sec 4.,  
the "...updating data replicated to the consumer server..." is taught by Stokes at p. 3,  
sec 4.,

the "...and resolving conflicts of the replicated data..." is taught by Shaheen at  
col. 7, lines 66-68 and col. 2, lines 55-61,  
the "...using a time stamp..." is taught by Bahl at col. 6, lines 20-28,  
the "...to determine the consumer server..." is taught by Stokes at p. 3, sec. 4.,  
and the "...holding the most recent version of the replicated data..." is taught by Bahl at  
col. 6, lines 40-43 and col. 7, lines 18-20.

29. Claims 15, 16, 19, and 23 are rejected under 35 U.S.C. 103(a) as being  
unpatentable over Stokes, Shaheen, and Bahl as applied to claim 13 above, and further  
in view of Cai and Dietterich.

30. As per claim 15, the "...replication of data..." is taught by Stokes at p. 3,  
sec. 4.,  
but the "...is managed by the plurality of pluggable services..."  
and the "...using a directory information tree..." is not taught by either Stokes, Shaheen,  
or Bahl.

However, Cai teaches the use of pluggable services as follows:

"...The pluggable service delivery platform shown in FIG. 1  
comprises three parts, Device Abstraction Layer (DAL), Service  
Abstraction Layer (SAL) and Kernel Service Engine..." at pp. 2  
and 3, par. 0045.

It would have been obvious to one of ordinary skill at the time of the invention to  
combine Cai with Stokes, Shaheen, and Bahl to provide pluggable services in order to

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support many formats of data during the replication of data from one server to another and provide greater acceptance of the system. Stokes, Shaheen, Bahl, and Cai have related applications and use many technologies in common. Stokes, Shaheen, Bahl, and Cai teach the use of servers, the use of protocol, and the replicating or updating of data, Stokes, Shaheen, and Cai teach the use of directories, and Shaheen, Bahl, and Kai teach the use of computers and the use of networks. Stokes provides supplier and consumer servers and directories, Shaheen provides services to manage replication of data and change logs, Bahl determines the need to replicate data, and Kai provides the pluggable services.

Kai does not teach the use of directory information trees.

However, Dietterich teaches the use of a directory information tree as follows:

"...The set 66 thus is a collection of directory information organized hierarchically, for example as a tree structure or as a graph, rooted in the root 80..." at col. 6, lines 58-61.

It would have been obvious to one of ordinary skill at the time of the invention to combine Dietterich with Stokes, Shaheen, Bahl, and Cai to provide directories organized in a tree structures in order to use standard structures for directories in operating systems and gain acceptance of the system. Stokes, Shaheen, Bahl, Cai, and Dietterich have related applications and use many technologies in common. Stokes, Shaheen, Bahl, Cai, and Dietterich teach the use of servers, the use of protocol, and the replicating or updating of data, Stokes, Shaheen, Cai, and Dietterich teach the use of directories, and Shaheen, Bahl, Kai, and Dietterich teach the use of computers and the use of networks. Stokes provides supplier and consumer servers and



directories, Shaheen provides services to manage replication of data and change logs, Bahl determines the need to replicate data, Kai provides pluggable services, and Dietterich provides directories organized as tree structures.

31. As per claim 16, the "...replication of data...", is taught by Stokes at p. 3, sec. 4.,  
the "...is managed by the plurality of pluggable services...", is taught by Cai at pp. 2 and 3, par. 0045,  
and the "...using a directory information subtree...", is taught by Dietterich at col. 6, lines 58-67.

32. As per claim 19, the "...plurality of services...", is taught by Shaheen at col. 4, lines 18-21,  
the "...comprises a change sequence number service...", is taught by Stokes at p. 9, sec. 5.3.2.1.,  
the "...creating a unique combination of numbers...", is taught by Stokes at p. 9, sec. 5.3.2.1.,  
the "...used to determine ordering of an update operation...", is taught by Stokes at p. 2 and 3, sec. 3.,  
the "...for an attribute value in an entry...", is taught by Stikes at p. 10, sec. 5.3.2.5. and p. 8, sec. 5.3.1,  
and the "...in the directory information tree...", is taught by Dietterich at col. 6, lines 58-61.

33. As per claim 23, the "...plurality of services...", is taught by Shaheen at col. 4, lines 18-21,  
the "...comprises a replication agreement service...", is taught by Dietterich at col. 10, lines 31-39,  
"...comprising an entry in the directory information tree...", is taught by Dietterich at col. 6, lines 58-67,  
and the "...describing a relationship between the supplier server and the consumer server...", is taught by Stokes at p. 4 and 5, sec. 4.2.

34. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes, Shaheen, and Bahl as applied to claim 13 above, and further in view of Aiello et al. (U.S. Patent No. 6,397,329).

As per claim 13, the "...updating data...", is taught by Stokes at p. 3, sec 4., but the "...is performed with a incremental update protocol...", is not taught by either Stokes, Shaheen, or Bahl.

However, Aiello teaches the use of incremental update protocol as follows;

"...FIGS. 10A and 10B illustrate an incremental update method according to a third embodiment of the present invention..." at col. 8, lines 26-28.

"...Currently a certificate revocation list (CRL) protocol is used by some CAs..." at col. 4, lines 12-13.

It would have been obvious to one of ordinary skill at the time of the invention to combine Aiello with Stokes, Shaheen, and Bahl to provide incremental update protocol in order to reduce the cost and time required to replicate the data between computers in networks. Stokes, Shaheen, Bahl, and Aiello have related applications and use many

technologies in common. Stokes, Shaheen, Bahl, and Aiello teach the use of protocol and the replicating of data, Stokes, Shaheen, and Aiello teach the use of directories, and Shaheen, Bahl, and Kai teach the use of computers and the use of networks. Stokes provides supplier and consumer servers and directories, Shaheen provides services to manage replication of data and change logs, Bahl determines the need to replicate data, and Aiello provides incremental update protocol.

35. As per claim 18, the "...updating data...", is taught by Stokes at p. 3, sec 4. and the "...is performed with a total update protocol...", is taught by Aiello at col. 17, lines 51-52 and col. 4, lines 12-13.

36. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes, Shaheen, and Bahl as applied to claim 13 above, and further in view of Shih.

As per claim 27, the "...plurality of services...", is taught by Shaheen at col. 4, lines 18-21,  
the "...comprises a uniqueid service assigning a unique identifier to an entry...", is taught by Stokes at p. 8, sec. 5.3.1.,  
but the "...added by a client...", is not taught by either Stokes, Shaheen, or Bahl.

However, Shih teaches clients adding entries as follows:

"...Consider if a client at replication site 302 wishes to add a new LDAP directory entry to the DIT 20 of FIG. 5..." at col. 8, lines 56-57.

It would have been obvious to one of ordinary skill at the time of the invention to combine Shih with Stokes, Shaheen, and Bahl allow clients to add entries in order to provide flexibility in updating the structures and gain acceptance of the system. Stokes,

Shaheen, Bahl, and Shih have related applications and use many technologies in common. Stokes, Shaheen, Bahl, and Shih teach the use of servers, the use of protocol, and the replicating of data, Stokes, Shaheen, and Shih teach the use of directories, and Shaheen, Bahl, and Shih teach the use of computers and the use of networks. Stokes provides supplier and consumer servers and directories, Shaheen provides services to manage replication of data and change logs, Bahl determines the need to replicate data, and Shih allows clients to add entries.

***Allowable Subject Matter***

37. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. No prior art has been identified which teaches the limitation of an "incremental update algorithm service" used for replicating data.

***Response to Arguments***

38. Applicants' arguments filed 1 December 2004 have been fully considered but they are not persuasive. In the first argument for independent claim 1 on page 3, paragraph 2, the Applicants state:

"The Examiner proceeds to state that Cai teaches a plurality of pluggable services. Although Cai arguably teaches the use of a pluggable service, the application of the pluggable service is not related to managing the replication of data contained within a directory server from the supplier server to the consumer server."

The Examiner disagrees. A pluggable service is a generic concept and is not related to any specific application. It is realistic to combine the Cai and Stokes references to

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provide pluggable services in order to support many formats of data during the replication of data from one server to another.

39. In the second argument for independent claim 1 on page 3, paragraph 3, the Applicants state:

"Further, the Examiner asserts that Shaheen teaches using a change log. However, Shaheen does not teach that the change log of data replicated to the consumer server is maintained on the consumer server. In addition, Shaheen does not teach or suggest that the replication of data is managed by the plurality of pluggable services using the change log."

The Examiner disagrees. This is taught by a combination of references from Stokes, Cai, and Shaheen. Stokes teaches "wherein replication of data" at p. 3, sec. 4, Cai teaches "is managed by the plurality of pluggable services" at pp. 2 and 3, par. 0045, and Shaheen teaches "using the change log" at col. 5, lines 12-14.

40. In the third argument for independent claim 1 on page 4, paragraph 1, the Applicants state:

In addition, the Examiner asserts that Stokes teaches an update resolution procedure service that determines the ordering of operations by comparing a first change sequence number of the supplier server to a second change sequence number of the consumer server. However, Stokes does not teach comparing a first change sequence number of the supplier server to a second change sequence number of the consumer server. Stokes merely mentions the term "change sequence number" and gives no explanation of how to use the change sequence number (see Stokes page 9, section 5.3.2.1), and Stokes does not teach how to use the change sequence number to determine the ordering of operations. Also, Stokes does not teach using an update resolution procedure. Stokes merely mentions the term "update resolution policy" (see Stokes page 3, section 3), but does not set forth an update resolution procedure service. In contrast, the claimed invention teaches an update resolution procedure service that determines the ordering of operations by comparing a first change sequence number of the supplier server to a second change sequence number of the consumer server (see pages 9-10, paragraph [0034] of the instant specification).

The Examiner disagrees. Independent claim 1 does not address the limitation comparing two change sequence numbers nor does it mention the limitation of an update resolution procedure. These are mentioned in dependent claim 5. Stokes teaches the application of "a total ordering to all of the updates" at pp. 2-3, sec. 3. This strongly suggests that sequence numbers would have to be compared in order to put them in order. Likewise, the statement of an update resolution policy strongly suggests the use of an update resolution procedure.

41. In the fourth argument for independent claim 1 on page 4, paragraph 2 and page 5, paragraph 1, the Applicants state:

"The Examiner asserts that Stokes teaches a replica update vector service. Stokes does not teach a replica update service that determines the set of updates to be sent to a data replica by consulting a replica update vector for the consumer server as asserted by the Examiner. Stokes only teaches that a replica update vector is sent if the consumer is prepared to accept updates (see Stokes page 6, section 5.2). Stokes does not teach how the replica update vector is used. Specifically, Stokes does not teach that the replica update vector may be used to determine the set of updates to be sent."

The Examiner disagrees. This limitation is not taught in independent 1, but it is mentioned in dependent claim 6. The replica update vector defines a set of updates. Therefore, the sending of a replica update vector defines a set of updates to be sent.

42. In the fifth argument for independent claim 1 on page 4, paragraph 2 and page 5, paragraph 1, the Applicants state:

"The Examiner also asserts that Shaheen teaches an incremental update algorithm service. However, the algorithm taught in Shaheen is a "bully" algorithm which elects servers based on the highest priority (see Shaheen column 6, lines 18-32). In contrast, the incremental update algorithm service taught in the claimed invention compares a first replica update vector of the supplier server and a second replica update vector of the consumer server to order an update sequence from the change log (see page 10, paragraph [0037] of the instant specification). Therefore, Shaheen does not teach an incremental update algorithm service."

The Examiner agrees. See above section on allowable subject matter.

43. In the sixth argument for claims 2-4 on page 5, paragraph 5 and page 6, paragraphs 1 and 2, the Applicants state:

"The Examiner asserts that Stokes teaches copying between a supplier server and a consumer server. However, Stokes only appears to teach a supplier sending an operation to a consumer, and a consumer sending an operation to the supplier (see Stokes page 3, section 4). In contrast, the claimed invention teaches a directory information tree copied between the supplier server and the consumer server (see claim 2 of the instant specification). Stokes does not teach copying; specifically Stokes does not teach or suggest copying a directory information tree. Furthermore, even though Dietterich arguably teaches a directory information tree, neither Stokes nor Dietterich teach or suggest copying a directory information tree between the supplier server and the consumer server, especially since Stokes does not teach copying as the Examiner asserted.

Further, the Examiner asserts that Stokes, Cai, and Dietterich teach that the replication of data is managed by the plurality of pluggable services using the directory information tree. As stated above, the pluggable services taught by Cai differ from the pluggable services in the claimed invention. In addition, even though Dietterich arguably teaches a directory information tree, none of Stokes, Cai, or Dietterich suggests having the pluggable services use the directory information tree to manage the replication of data."

The Examiner disagrees. Shaheen strongly suggests the use of a directory information tree as follows:

"...The preferred embodiment optimistically replicates a fileset or volume at multiple servers. A fileset can be a subtree of a file system or an information directory..." at col. 5, lines 3-5.

The argument about the "pluggable services" is a restatement of the first argument and has been adequately addressed in the response to the first argument. This limitation is taught by a combination of references from Stokes, Cai, and Diettrich. Stokes teaches "wherein replication of data" at p. 3, sec. 4., Cai teaches "is managed by the plurality of pluggable services" at p. 2 and 3, par. 0045, and Diettrich teaches "using the directory information tree" at col. 6, lines 58-61.

44. In the seventh argument for independent claims 13, 28 and 29 on page 7, paragraphs 1 and 2, the Applicants state:

“Further to the same arguments made above regarding Stokes and Shaheen, the following arguments address additional differences between the claimed invention and the Examiner’s assertions. The Examiner asserts that Shaheen teaches using a plurality of services to manage replication of data. However, the passage the Examiner cites from Shaheen teaches the use of a plurality of processors and a plurality of storage devices (see Shaheen column 2, lines 55-61). Further, Shaheen teaches that a Network Controller performs services to control access to the network (see Shaheen column 4, lines 18-21). Shaheen does not teach a plurality of services to manage replication of the data contained within the directory server from the supplier server to the consumer server.

In view of the above, Stokes and Shaheen, whether considered separately or together, fail to teach or suggest the present invention as recited in claims 13, 28, and 29. Bahl does not teach what Stokes and Shaheen lack, therefore claims 13, 28, and 29 are patentable over Stokes, Shaheen, and Bahl. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

The Examiner disagrees. This limitation is taught by a combination of Shaheen and Stokes references. Shaheen teaches “using a plurality of services to manage replication of data” at col. 4, lines 18-21 and col. 2, lines 55-61 and Stokes teaches “contained within the directory server from the supplier server to the consumer server” at p. 3, sec 4. There is no additional requirement for Bahl to teach this limitation since it is already adequately addressed by a combination of the Shaheen and Stokes references.

45. In the eighth argument for claims 15, 16, 19, and 23 on page 7, paragraph 4 and page 8, paragraph 1 and 2, the Applicants state:

“The Examiner asserts that Cai teaches the use of pluggable services. As argued above, the pluggable services taught in Cai differ from the pluggable services in the claimed invention. Further, the Examiner asserts that Stokes teaches the replication of data, and that Dietterich teaches to use a directory information tree (or subtree). However, as argued above, Stokes, Cai, and Dietterich do not teach or suggest providing replication of data managed by a plurality of pluggable services using a directory information tree (or subtree).



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For the same reasons stated above, Stokes, Shaheen, and Bahl whether considered separately or together, fail to show or suggest the present invention as recited in claims 15 and 16. Cai and Dietterich do not teach what Stokes, Shaheen, and Bahl lack, therefore claims 15 and 16 are patentable over Stokes, Shaheen, and Bahl in further view of Cai and Dietterich. Dependent claims 19 and 23 are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested."

The Examiner disagrees. The Applicants arguments on "pluggable services" and "directory information trees" are restatements of the previously presented first and sixth arguments. For this reason, the responses to the first and sixth arguments adequately cover this portion of the eighth argument. Likewise, since a combination of the Stokes, Shaheen, and Bahl references has already rendered obvious independent claim 13, upon which these claims depend, there is no additional requirement for Cai and Dietterich to contribute to the rejection independent claim 13. For these reasons, claims 15, 16, 19, and 23 are also rendered obvious.

46. In the ninth argument for claims 17 and 18 on page 8, paragraph 4 and page 9, paragraph 1 and 2, the Applicants state:

The Examiner asserts that Aiello teaches the use of incremental update protocol. However, Aiello merely states the term "incremental update method" (see Aiello column 8 lines 26-28), and does not teach how to use an incremental update protocol nor does Aiello teach what applications an incremental update protocol would be used. Neither Stokes nor Aiello teach or suggest using an incremental update protocol for updating data. In contrast, the claimed invention uses the incremental update protocol to compare the supplier server and consumer server replica update vectors to properly order the update sequence.

The Examiner disagrees. An incremental update method would be an implementation of an incremental update protocol. Aiello also teaches the use of protocol at col. 4, lines 12-13. The combination of an incremental update method and a protocol strongly suggests the use of an incremental update protocol.

47. In the tenth argument for claims 17 and 18 on page 10, paragraph 1, the Applicants state:

"Further, the Examiner asserts that Aiello teaches the use of a total update protocol. Aiello does not teach the use of a total update protocol; in fact, Aiello does not even use the term "total update protocol" or any equivalent terms. Aiello teaches a "total daily update cost" (see Aiello column 17 lines 51-52) that is used to perform a cost comparison, which is totally unrelated to the update protocol of the present invention. For the same reasons stated above, Stokes, Shaheen, and Bahl whether considered separately or together, fail to show or suggest the present invention as recited in claims 17 and 18. Aiello does not teach what Stokes, Shaheen, and Bahl lack, therefore claims 17 and 18 are patentable over Stokes, Shaheen, and Bahl in further view of Aiello.

The Examiner disagrees. If Aiello is considering the cost of performing a total daily update, there must be a procedure for performing the total daily updates. Likewise, a procedure is an implementation of a protocol. For this reason, the Aiello teaches "is performed with a total update protocol" is taught by Aiello at col. 17, lines 51-52 and col. 4, lines 12-13 by combining the performing of total daily updates and the use of a protocol.

48. In the eleventh argument for claim 12 on page 9, paragraph 2, the Applicants state:

"Claim 12 stands rejected under 35 U.S.C. § 103(a) as obvious over Stokes, Cai, and Shaheen, and in further view of U.S. Patent Number 6,615,223 ("Shih"). This rejection is respectfully traversed. For the same reasons stated above, Stokes, Cai, and Shaheen, whether considered separately or together, fail to show or suggest the present invention as recited in claim 12. Shih does not teach what Stokes, Cai, and Shaheen lack, therefore claim 12 is patentable over Stokes, Cai, and Shaheen in further view of Shih. Accordingly, withdrawal of this rejection is respectfully requested."

The Examiner disagrees. Since the responses to the first and second arguments have shown that independent claim 1 is still rendered obvious, claim 12 is dependent on

independent claim 1, and no additional arguments have been presented for claim 12, then claim 12 is still rendered obvious.

49. In the twelfth argument for claim 27 on page 9, paragraph 2, the Applicants state:

"For the same reasons stated above, Stokes, Shaheen, and Bahl, whether considered separately or together, fail to show or suggest the present invention as recited in claim 27. Shih does not teach what Stokes, Shaheen, and Bahl lack, therefore claim 27 is patentable over Stokes, Shaheen, and Bahl in further view of Shih. Accordingly, withdrawal of this rejection is respectfully requested."

The Examiner disagrees. Since the responses to the sixth and seventh arguments have shown that independent claim 13 is still rendered obvious, claim 27 is dependent on independent claim 13, and no additional arguments have been presented for claim 27, then claim 27 is still rendered obvious.

### ***Conclusion***

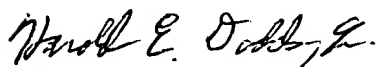
50. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

51. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harold E. Dodds, Jr. whose telephone number is (571)-272-4110. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on (571)-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Harold E. Dodds, Jr  
Patent Examiner  
April 7, 2005



C. E. ROBINSON  
PRIMARY EXAMINER